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ABSTRACT

A total of 10 studies since 1962 pertaining directly to the use of cloze procedure as a teaching technique are initially reviewed. The reviewed literature is then synthesized to determine what is currently known about cloze as a teaching device and to identify general weaknesses in this research area. General problems identified are no real teaching, lack of focus, weak experimental designs, measurement problems, and omissions in reporting studies. It is concluded (1) that research evidence does not indicate the cloze procedure to be an effective teaching technique and (2) that past research in this area has been rather narrowly conceived and limited in scope. The author also feels that little attention has been focused on appropriate instructional strategies, methods of presentation, and relative effects of varying deletion systems or benefits derived by different age or grade levels. Based on the problems identified, suggestions are made as to the direction future research might take, and guidelines for reporting cloze research are offered. This publication is one of the "Reading Information Series: Where Do We Go?," designed to strengthen the research in reading education. A bibliography is included. (AW)

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THE CLOZE PROCEDURE AS A TEACHING TECHNIQUE

Eugene Jongsma

AA 000 732

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Reading Information Series
WHERE DO WE GO?

The Cloze Procedure as a Teaching Technique

by
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U. S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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Foreword

ERIC/CRIER and IRA are concerned with several types of information analysis and their dissemination to audiences with specific professional needs. Among these is the producer of research—the research specialist, the college professor, the doctoral student. It is primarily to this audience that the present series is directed, although others may find it useful as well. Therefore, the focus will rest clearly on the *extension* of research and development activities: "Where do we go?" Our intent is not to provide a series of exhaustive reviews of literature. Nor do we intend to publish definitive statements which will meet with unanimous approval. Rather, we solicit and present the thoughtful recommendations of those researchers whose experience and expertise has led them to firm and well-considered positions on problems in reading research.

The purpose of this series of publications is to strengthen the research which is produced in reading education. We believe that the series will contribute helpful perspectives on the research literature and stimulating suggestions to those who perform research in reading and related fields.

Richard A. Earle
Series Editor

Since 1953, the body of literature pertaining to the cloze procedure has grown substantially. During this period, most of the research has focused on three areas: (1) cloze as a technique for measuring reading comprehension; (2) cloze as a quantitative measure of readability; and (3) cloze as a tool for investigating language variables. A number of writers and researchers have also recommended the cloze procedure as a suitable teaching device. Their recommendations are based on the assumption that by going through the task of completing cloze units, a reader will gain insights into the process of using context, recognizing the interrelationships of language, and consequently improving comprehension skills. Very little research has been conducted using the cloze procedure as a teaching technique.

The purpose of this paper is threefold. The author will first critically review the literature pertaining directly to the use of cloze as a teaching technique. A number of related studies in which cloze has been used as a measure of comprehension following other instruction will be deliberately excluded so that full attention is focused on cloze as a means of instruction in itself.

Secondly, an attempt will be made to organize and synthesize the literature that is reviewed in order to determine what is currently known about cloze as a teaching device and to identify general weaknesses in this research area.

Thirdly, based on the problems and weaknesses identified in section two, suggestions will be offered as to the direction future research might take in this area. At this point, related studies and opinion will be cited when they add to our knowledge of cloze and lend further evidence to research needs.

Review of the Literature

Wilson L. Taylor is generally credited with being the "father" of the cloze procedure. In originating the cloze procedure, Taylor drew upon Miller's work in communication theory, Osgood's "dispositional mechanisms," and the principles of statistical random sampling. His definition of cloze, which has also been accepted by most others working with the cloze procedure, considers cloze "a method of intercepting a message from a 'transmitter' (writer or speaker), mutilating its language patterns by deleting parts, and so administering it to 'receivers' (readers and listeners) that their attempts to make the patterns whole again potentially yield a considerable number of cloze units." (1953, p. 416).

Much of the past research has concentrated on cloze as a measurement device. Many studies have examined the validity and reliability of cloze as a measure of comprehension. Several others have investigated cloze as a measure of readability. More recent efforts have explored the use of cloze as a measure of certain language variables related to reading. Relatively few studies, however, have experimentally used cloze as a means of instruction. A chronological review of these studies follows.

Roossinck (1962) was one of the first investigators to use cloze as a teaching technique. Using Donald E.P. Smith's model of comprehension, she developed a type of programmed learning procedure which consisted of a series of 200 cloze exercizes, or frames. The frames gradually increased in difficulty according to: (1) the components of Smith's model–summation, classification, and abstraction; and (2) grammatical complexity. Roossinck developed a scheme of gradual grammatical complexity, moving from simple sentences to more complex sentences to combinations thereof, and increasing the number of modifiers. In addition to using selections from social studies and science texts, written directions and excerpts from informational brochures were also employed. Deletions were made selectively, and vocabulary and concept load were purposely kept

low (4th grade level) so as not to interfere with comprehension. Using the principles of linear programmed learning, subjects were immediately reinforced at the completion of each frame, and each subject proceeded at his own rate. In some cases, synonyms were scored as correct responses. The instructional package was administered to one sixth grade class, composed of 18 students, in two sittings, 100 frames being given in each session.

Roossinck's study must be considered exploratory. The small number of subjects used, and the lack of randomization make any generalizing dangerous. In addition, the reader is uncertain as to just what is being evaluated in this study–the ability of sixth graders to use a programmed learning format, the use of cloze to improve comprehension, or both. In fact, Roossinck admits that a large number of student errors were due to confusion over directions and the mechanics of the program. She reports that students were correct on 75-95 percent of the frames. While a high success ratio is desirable in programmed learning, this high performance is well above the proportion of successful clozures found in other cloze studies. Perhaps the biggest limitation of this study is the lack of evidence that the frames actually improved comprehension or increased reading proficiency. Because the "instruction" was limited to two 50 minute sessions, the question is probably moot.

The significant features of the Roossinck study were: (1) the development of a hierarchy of grammatical complexity; (2) a conscious attempt to control deletions while gradually increasing exercise difficulty; and (3) the innovative linkage of the cloze procedure with programmed instruction.

In another early attempt at the instructional use of cloze, Bloomer (1962) used the cloze procedure as a remedial teaching technique for college students. Of the three groups used in the study, one received cloze exercises based on every-tenth word deletions, a second proceeded with traditional remedial exercises, and the third group received no treatment at all. The cloze exercises used basal, science, and social studies materials of elementary grade levels. The selections

were graduated in difficulty, and a criterion of 96 percent correct was set for movement from one level to another. The subjects had access to scoring keys to check their own work after completion of an exercise, but synonyms were also counted correct by the instructor, although this aspect is not fully explained. Pre- and post-testing with the survey section of the *Diagnostic Reading Test* revealed that the group using cloze exercises increased significantly more in comprehension and total reading ability. Also, the achieved grade point averages for the cloze group were greater than the predicted grade point averages made at the beginning of the study, although the predictor variables are never mentioned. As a result of this study, Bloomer felt "the cloze procedure does have a positive effect on comprehension and college grades." (p. 178)

Bloomer's conclusion appears to be overly enthusiastic. The selection of subjects (volunteers), experimental mortality, regression effects, and lack of adequate control make one skeptical of the results of this study. Furthermore, in neither remedial treatment, cloze or traditional, was any deliberate teaching conducted. In both circumstances, the instructor filled a clerical role only, by taking attendance and recording scores. Direct instruction was avoided, according to Bloomer, to reduce the instructor variable. One must also question the depth of the instructional program and its lasting effects, for in some cases, students completed the instructional sequence in a brief twelve sessions.

Friedman (1964) employed the cloze procedure in teaching foreign students at the University of Florida. She constructed 20 cloze exercises, using every-fifth word deletions, over materials from *McCall-Crabbs Standard Test Lessons in Reading*. Two experimental groups received two cloze exercises per week for ten weeks. Credit was given for synonyms, and multiple-choice comprehension questions followed each cloze exercise. By contrast, a control group received four regular *McCall-Crabbs* lessons per week for ten weeks. Although both groups made gains in comprehension, there was no significant difference between the mean gains of the two groups.

However, the difference in the amount of instruction the two groups received, two versus four exercises per week, may have had an effect. As in the previous two studies, instruction is for such a brief duration that one questions the permanency of results.

Schneyer (1965) explored the effects of the cloze procedure upon the reading comprehension of sixth grade pupils. Two types of cloze exercises were used; one built on every-tenth word deletions and the other on noun-verb deletions. Schneyer based his two deletion systems on the lexical-structural dichotomy introduced by Rankin (1957). Three exercises of each type were developed for each reader level of a basal series. The passages were 200 words in length, each containing 20 deletions. Two classes were used in the study: the experimental class proceeded with the regular reading program, but, in addition, received one cloze exercise a day, alternating between the two types; the control group received the regular basal instructional program. The cloze exercises were scored the same day by the teacher, using exact replacement responses, and returned to the students with the correct choices indicated. Scores were obtained for each student on the *California Test of Mental Maturity, Gates Reading Survey,* and an informal word recognition test. After approximately 11 weeks, the students received a post-test on the *Gates Reading Survey.* An analysis of covariance, using the Gates pre-test as an antecedent variable, showed no significant difference between the two groups in comprehension. In a further analysis of the results, Schneyer points out "that students whose word recognition ability was at the sixth reader level or above performed significantly better on the cloze exercises than did students whose word recognition ability was at fifth reader level or below." (p. 177). The total results for each of the two types of cloze exercises were correlated with the intelligence and reading test results. Both cloze types correlated significantly with the language-I.Q. results. The tenth-word deletion system was much more highly related to intelligence than was the noun-verb deletion system (.63 vs. .42). This seems to substantiate Rankin's earlier contention that the

every-nth deletion system is more related to intelligence, whereas the selective deletion of nouns and verbs provides a measure of comprehension less influenced by intelligence. In explaining the results, Schneyer hypothesized that discussion of the reasons for selecting responses might be more effective than just checking for correctness.

Contrasted with the previous studies, Schneyer's investigation differs in: (1) increased exposure to cloze exercises; students responded daily rather than once or twice a week, and for a longer period of time; and (2) a more sophisticated treatment of the data, rather than a reliance on crude gain scores. The lack of randomization in the selection and assignment of subjects was overcome somewhat by the analysis of covariance technique, but still limits the generalizability of the findings. Another weakness was the disregard of teacher differences and their effect on the outcome. Perhaps cloze type—every-nth versus noun-verb deletions—could have been incorporated into the study as an additional factor and reduced the confounding effects of the experimental variable.

In a somewhat different approach, Blumenfield and Miller (1966) first wanted to determine what good English students knew grammatically that enabled them to learn material more efficiently than poor students. Secondly, they wanted to use their findings from the first part of the study to teach the poor students that information to determine if it had any effect on their reading ability. They used 36 passages, each 150 words in length, ranging in difficulty from first grade level through advanced readings in experimental psychology. An every-fifth deletion system was used, and the starting point rotated so as to produce five cloze forms, with a measure of difficulty of each word, for each passage. A word class score, based on the number of insertions that were grammatically satisfactory, regardless of their meaning, was used to analyze the results. The percentage of word class completions represented grammatical difficulty. After analyzing individual word classes to determine differences, the authors found no significant differences

between the performances of good and poor students on any word class. In fact, on some word classes, all students had 100 percent completions. It appeared that by the time a student reached college, he had mastered the grammar of his language.

In the instructional phase of the study, the authors compared pre and post-scores on the *Davis Reading Test* for a group of remedial students who completed the 36 cloze passages. No significant improvement in reading ability was noted. As a result of their findings, the authors concluded that it was fruitless to teach traditional grammatical concepts past the high school level.

Once again, "instruction" is interpreted as the act of merely filling in cloze exercises. Apparently, students received no feedback as to the quality of their performance as they progressed through the instructional package. The authors were vague on some aspects of their experimental design. For example, they claim to use "standard matched group control procedures" (p. 753), without ever explaining on what variable(s) the groups were matched. Also, the dichotomy of good versus poor students employed in this study loses some of its relevance when applied to college students. The most significant contributions this study made did not come from its instructional aspect, but from the first phase of the study, by extending our knowledge of the structure of our language and its relationship to reading.

Probably the most ambitious investigation of cloze as a teaching technique was a Cooperative Research Project conducted by Bloomer and others (1966; Heitzman & Bloomer, 1967). The authors hypothesized that the act of filling in a cloze unit was in itself intrinsically reinforcing for the subject—a type of non-overt reinforcement. In the first phase of their study, fifth, seventh, ninth, and eleventh graders received a total of six cloze exercises in a three week period. In the second phase, termed "longitudinal," ninth graders continued working two cloze exercises per week for a period of twelve weeks. Over 1000 students from 49 classrooms were involved in the study. Seven treatment conditions were developed. Twenty-

four passages of 600-700 words each, containing a complete episode, and consisting of 5th-6th grade reading levels (determined by the Yoakum formula) were employed. Treatments consisted of: (1) no deletions; (2) random deletions; and deletions of (3) nouns; (4) verbs; (5) modifiers–adjectives and adverbs; (6) function words–prepositions and conjunctions; and (7) noun determiners. Deletions were made on 10 percent of the passages. Each passage was followed by 12 comprehension questions, six factual and six inferential, which had been developed and validated in a previous pilot study. Subjects were randomly assigned to one of seven groups. Classroom teachers administered the exercises to control for experimenter effects. In the longitudinal phase, order effects were controlled by randomly administering the exercises in blocks of six.

Pre-tests consisted of the *Differential Aptitude Test* (DAT) and the *California Test of Mental Maturity* (CTMM). Three post-tests were given: (1) language and reading sections of the *Iowa Test of Basic Skills* (ITBS); (2) a final cloze test, 1000 words in length with random deletions of each type, was given one and a half weeks after completion of the treatments; and (3) a recall comprehension test, composed of a random selection of multiple-choice items found at the end of each passage, was administered 10 weeks after completion of the treatment exercises. Although the analysis of the data was lengthy and complex, the basic finding was that "the use of non-overt reinforced cloze procedure does not increase reading ability either during the process or as a function of post-treatment testing" (Heitzman and Bloomer, 1967, p. 218). There was no significant improvement in comprehension test scores as subjects progressed through the cloze exercises. The number of correct closures was moderately related to the Iowa Tests of Basic Skills reading scores, only slightly related to immediate comprehension scores, and inversely related to recall comprehension post-test scores. The authors concluded that the ability to make closures was related to the reading ability of the subject, but the ability to answer immediate comprehension questions was dependent on the type of cloze procedure used. The results confirmed the differential effects

of varying syntactic deletions. In fact, the deletion of noun determiners produced comprehension superior to that of intact passages. The removal of modifiers, on the other hand, distorted meaning and hampered comprehension. The authors felt that the value of cloze in teaching comprehension is directly related to the method by which it is presented. Their suggestions for increasing the effectiveness of cloze in teaching included: (1) more reinforcement by the teacher for correct responses, including synonyms: and (2) providing a motivational scheme in that a subject's movement through the exercises is contingent upon the quality of his responses.

Probably the most significant aspect of this study was the evidence of differential effects of cloze exercises based on varying syntactic elements. At first, this may appear to contradict Blumenfield and Miller's results, mentioned earlier, but the divergent results are due to important differences between the two studies. Bloomer scored responses in terms of exact replacement only, whereas Blumenfield and Miller counted all "grammatically correct" responses as satisfactory. Secondly, Bloomer's subjects were much younger than the college students used by Blumenfield and Miller.

While the Bloomer study appears larger and more sophisticated, it suffers from some of the same drawbacks as previously reported studies. The brief duration of the cross-sectional phase of the study—a mere six exposures to the treatment—is hardly enough to cause anything more than the most superficial effects on the reader. Much like previous studies, no actual teaching took place. The fact that the lack of teaching was explained by a pseudo-psychological rationale—no-overt reinforcement—did not make it less real. By the conclusion of the study, the authors were suggesting strongly the need for more reinforcement, feedback, and although not mentioned directly, more teaching.

Martin(1968) investigated the differential effects of instruction in transformational grammar, and the completion of cloze exercises, on reading, writing, and listening. Subjects were freshmen at South Carolina State College. One half of the 100 experimental subjects

studied *Grammar 1* and *Grammar 2*, an introduction to transformational grammar by Jacobs and Rosenbaum. The other half of the experimental subjects received 18 cloze exercises. The control group of 42 students took the regular freshman English composition course. Although students were permitted to sign up for any class they desired, there was no significant difference in SAT-Verbal scores among the three groups.

The cloze passages were taken from a variety of content sources and selective deletions of lexical elements—nouns, verbs, adjectives, and adverbs—were made. During the first week, two multiple-choice alternatives, based on grammatical and semantic criteria, were given for each cloze blank. After the first week, no multiple-choice alternatives were used. The cloze training consisted of the completion of an exercise followed by the teacher-led class discussion, where the students were encouraged to verbalize their answers.

After nine weeks, the duration of the study, post-tests were given in reading achievement, writing, listening, ability to recognize linguistic structures, and language arts skills. Overall results indicated that both experimental groups made significantly greater gains on the *Iowa Silent Reading Test* than the control group. There were no significant differences, however, between the experimental groups. Martin concluded that: (1) neither experimental treatment was superior to the other; and (2) verbalizing the reasons for closures did seem to be appropriate for instruction using the cloze procedure.

Martin's study marks the first real attempt to employ the cloze procedure in an actual teaching situation. Rather than relying merely on the completion of closures, students became involved in discussing their responses and the reasons behind them. Not surprisingly, Martin's findings reversed the non-significant trend of previous studies.

While the results are encouraging, certain weaknesses must be noted. The influence of instructors was not controlled. In fact, at one point, Martin explains that "the teachers had been previously instructed in

transformational grammar and were more familiar and comfortable with it." (p. 74) Certainly the ability and enthusiasm of an instructor for a particular method would have a significant impact on student achievement.

Although Martin credits student discussion of closures for much of the success of the cloze teaching method, verbalization of responses was not an experimental variable in the study and indeed, was not tested for effectiveness.

Guice (1969) conducted an investigation to determine whether a group of college students who received regular instruction in reading comprehension plus instruction in and practice with the cloze procedure, would make significant gains in comprehension when compared with a group of students who received the regular comprehension instruction. The 16 cloze exercises used were based on every-nth (rate of deletions never specified) deletions of concept words—nouns, verbs, adjectives or adverbs. Two points were scored for exact replacement and one point for synonyms. The following pre-tests were administered: (1) *Cooperative English Tests, Reading Comprehension,* (2) *Guilford, Merrifield, and Christensen Test of Creativity "Consequences,"* (3) *Guilford, Merrifield, Christensen, and Wilson Test of Creativity "Alternate Uses,"* and (4) *Otis Quick-Scoring Test of Mental Abilities.* Analysis of variance, based on pre and post-testing on the Reading Comprehension section of the *Cooperative English Test,* showed the experimental group did not improve significantly more than the control group. It appeared from the results that other factors were at play in Guice's study. That is, both afternoon groups, regardless of treatment, did better than the morning groups. The correlation matrix reveals some interesting points. Cloze correlated quite low (.20) with gain scores, which is not too surprising since gain scores are less reliable than either pre or postmeasures. Secondly, cloze correlated highly (.79) with creativity (although the creativity measure used to obtain the coefficient is not mentioned). Cloze showed only a moderate relationship (.40) with intelligence, substantiating previously mentioned results regarding selective-deletion systems.

An unusual aspect of this study was Guice's approach to course content. He based the course content and the selection of passages on a content analysis of the comprehension test he used. This certainly represents a reversal of what is considered good practice in the field and must be interpreted as a pure and simple case of "teaching for the test." Notable omissions in Guice's report of this study are: (1) rate of deletions; (2) number of deletions per passage; (3) length of passages; (4) description of the "regular" instructional program; (5) a rationale for acceptable synonyms (syntactic versus semantic considerations); and (6) a description of how cloze was used and whether any real instruction took place.

A fairly recent and innovative approach to the use of cloze as a teaching technique is that reported by Kingston and Weaver (1970). They examined the use of cloze-like tasks with culturally disadvantaged first graders. Although the emphasis of the study was on the predictive power of cloze tests, cloze-like instruction was an essential part of the investigation. Essentially, the cloze procedure was combined with a language experience approach to beginning reading. Students were gradually introduced to cloze during their regular reading lessons by having lexical items deleted from their experience stories and having to suggest all words that would make sense for the deletions. Their contributions were discussed and related to the context. Initially, pictures were used as visual clues to the deleted items. Chalkboard stories were typed, using a primary typewriter, and exchanged among classes. Later, teachers read stories to the children, while the children read silently, attempting to fill the deletions. The following tests were given during the school year: (1) a series of cloze tests; (2) the Ginn Pre-Primer Achievement Test; (3) the Ginn Primary Achievement Test; (4) the *Lee-Clark Readiness Test;* and (5) the reading, arithmetic, and language sections of the *California Achievement Test.* Test-retest reliability estimates were obtained for all tests on a subset of the population. Four types of cloze tests were used: (1) "any-word cloze"–based on every-n^{th} deletions with a total of 50 deletions, presented in five sessions with

ten items each; (2) multiple-choice, structural cloze–deletion of function words with the deleted words paired with distractors of the same grammatical class and randomly ordered after five deletions; (3) multiple-choice, lexical cloze–every-fifth deletion of nouns, main verbs, or adjectives using the same multiple-choice format mentioned above; and (4) aural-reading cloze-based on random, every-n^{th} deletions, but read orally by the teacher, while students read silently, with the teacher pausing 30 seconds at each deletion while the students wrote in their responses.

The various test scores were entered into a step-wise regression analysis using the *California Reading Test* as the criterion variable. Surprisingly, the multiple-choice, lexical cloze test was the best single predictor (multiple R=.68) of first grade reading achievement, with the any-word cloze test a close second (multiple R=.73). Both of these cloze tests proved to be better predictors, given the intervals of administration, than the standardized readiness test. Other tests added significantly more predictive power, but the relative increases in percentages were comparatively low. According to Kingston and Weaver, "it was demonstrated in this study that first graders could perform on written cloze tests soon after they began reading" (p. 13). In addition to bridging the oral-written language gap, the cloze technique was highly motivating to the culturally disadvantaged students in this study.

The Kingston and Weaver study is notable because it represents a genuine attempt to innovatively adapt the cloze procedure as a teaching technique. Contrary to most previous studies, cloze was used in a real teaching situation. Another first was the effort to obtain reliability estimates for the cloze instruments on comparable samples of students.

While the results of this study are encouraging, there is no direct evidence that the use of the cloze procedure contributed to increased reading proficiency. Indeed, this was not the purpose of the study. We may infer, however, that cloze, as used in this study, showed

promise as an instructional technique. The multiple-choice format employed in this study is reminiscent of the technique used by Gallant (1964), but the use of grammatical class in the selection of distractors is a decided advantage. One wonders, however, whether the multiple-choice modification departs considerably from the theory upon which the cloze procedure is based. How does this change in format alter the task of the reader? Lastly, one must be cautious in comparing the predictor variables used in this study because of the time difference in the administration of the tests. For example, the readiness test was given during the first week of school, but the cloze tests were administered in February and March. While it may be appropriate to say that cloze tests add considerably to the prediction of first grade reading achievement, it may not be appropriate to claim that cloze tests are better predictors than the readiness test without considering the time interval involved.

A total of nine studies pertaining directly to the use of cloze as a teaching technique have been reviewed in this section. In the following section, these studies will be considered as a collective group, in an effort to synthesize our current state of knowledge and to pinpoint problems common to this research area.

Problems of Past Cloze Research in Teaching

Contrary to the recommendations frequently made by authorities in the field, the research evidence, at the present time, does not suggest that the cloze procedure is an effective teaching technique. For the most part, independent studies, across a range of age levels, have demonstrated that the cloze procedure, used either as a supplement to or in lieu of "regular" reading instruction, does not produce significantly improved results in reading proficiency. Table 1 provides a capsule summary of the relevant studies. Before dismissing the cloze procedure as a teaching technique, some of the common problems that have plagued past studies will be identified, and, in the final section of this paper, attention will be turned to future research efforts that will confront these problems.

Table 1 Summary of cloze teaching studies

Author	*Type of population*	*Type of deletion system*	*Results*
Roossinck (1962)	One sixth grade class (n=18)	Programmed format with selective deletions	No real test of the effectivness of cloze
Bloomer (1962)	Three groups of college students (n=127)	Every-10th deletion system with a 96% criterion for movement through passages	Significant differences in reading comprehension in favor of group using the cloze procedure
Friedman (1964)	Three groups of foreign students at university level	Every-5th deletion system on 20 passages from *McCall-Crabbs*	No significant difference in reading comprehension
Schneyer (1965)	Two sixth grade classes (n=66)	(1) Every-10th word deletions (2) Noun-verb deletions	No significant difference in reading comprehension
Blumenfield & Miller (1966)	One class of freshman college English students (n=20)	Every- 5th deletion system, rotated to produce five forms	No significant difference in reading ability
Bloomer, *et.al.* (1966)	Cross-section of 5th, 7th, 9th and 11th graders (n=1000 plus)	Non-overt reinforced, with 10% deletions of (1) random, (2) nouns, (3) verbs, (4) modifiers, (5) function words, (6) noun determiners, and (7) a control passage of no deletions	No significant differences in reading comprehension
Heitzman & Bloomer (1967)	Longitudinal study of 9th graders (n=125)		Evidence of differential effects due to varying syntactic deletions
Martin (1968)	Three groups of college freshmen (n=142)	Selective deletion of lexical elements—nouns, verbs, adjectives, and adverbs; Some use of multiple-choice format	Significant difference in reading ability in favor of group using the cloze control group Evidence that verbalizing the reasons for closures is effective
Guice (1969)	Four groups of college students (n=26)	Every-n^{th} deletion of concept words—nouns, verbs, adjectives, adverbs	No significant differences in reading comprehension
Kingston & Weaver (1970)	Culturally disadvantaged first graders (n=74)	(1) Any-word cloze—random, every-n^{th}, (2) Multiple-choice, structural cloze—function words (3) Multiple-choice lexical cloze—nouns, verbs, adjectives (4) Aural-reading cloze—random, every-n^{th} deletions	Cloze-like tasks can be used effectively with first graders Cloze tests can serve as effective predictors of 1st grade reading achievement

Although only a small number of studies comprise the body of literature directly related to cloze teaching, these studies seem to share some common problems. To be sure, some of their weaknesses are similar to those of methodology studies, in general, in reading. However, the intention here is to focus on particular weaknesses relevant to studies using cloze as a teaching technique.

1. *No real teaching.* It appears that the thoughts of past investigators have bordered between over-optimism and naiveté. For the most part, investigators have not incorporated any direct instruction with the use of cloze. Instead, these investigators have relied on the cloze procedure itself to do the work. They have felt that students could improve their reading ability simply by going through the process of completing cloze exercises. In those exceptions where instruction did take place (Martin, 1968; Kingston & Weaver, 1970), the results were promising. *The absence of direct teaching alone might well account for the lack of significant differences in some of the studies.*

In addition, the periods of instruction, insofar as they existed, were extremely brief, sometimes as few as six exposures to cloze exercises. It is doubtful that any teaching technique, regardless of its quality, could produce anything more than superficial effects under such a brief trial.

2. *Lack of focus.* One reason for the absence of direct instruction may be that the investigators seemed to lack a lucid definition of the problem. They seldom exhibited a clear notion of intent. On the contrary, they employed the cloze procedure in hopes of improving "reading comprehension," or that monolith—"general reading ability." Virtually no one has considered the use of cloze with other aspects of reading such as vocabulary, or the use of context clues.

3. *Weak experimental designs.* The lack of a clear focus and a true grasp of the problem leads to experimental designs which are vague and inadequate and to failure to control relevant experimental variables. In some studies, variables were confounded. For example,

deletion systems, in some cases, were confounded with the method of presentation. In such situations, the researcher is uncertain as to which factor is responsible for the resulting effects. In other studies, relevant variables such as time spent on instruction and the effects of the instructor, were not incorporated into the design and, consequently, not controlled. In several of the studies, lack of randomness was apparent in the selection of subjects and in their assignment to treatment conditions. External validity was seriously restricted in many studies because of the highly select samples of subjects—often taken from a class the investigator was teaching at the time.

4. *Measurement problems.* The measurement problems involved in the studies reported center around the difficulties in assessing growth. Quite naturally, the worth of a teaching method will be judged in terms of the growth it can produce in student achievement. However, the validity and reliability of the measures used to assess growth must be considered carefully. Most of the studies relied on standardized tests which purportedly measured reading comprehension or general reading ability. It is questionable whether most of these tests validly measured the skills students were taught during the instructional programs. In order to select a valid measurement instrument, an investigator must have defined carefully the reading behaviors he is seeking to develop in the instructional program. The lack of focus, a problem mentioned earlier, made this type of selection difficult.

There was a tendency to use crude gains, measured by the post minus pretest technique, as an assessment of growth. This is probably one of the most unreliable ways to measure student progress. Crude gains are particularly vulnerable to the effects of *regression.* When college subjects are selected because they are participating in a remedial reading program and presumably are at the extreme of the distribution, gains are likely to occur which are not due to the treatment.

5. *Omissions in reporting studies.* Research studies must be reported completely and accurately if readers are to make sound judgments in

accepting the results as applicable to their particular situations. Some investigators failed to report the kind of cloze procedure being used. They neglected to describe adequately the type, rate, and number of deletions made and the rationale underlying the system used. The nature of the content and the difficulty of the material used for the cloze passages were frequently not cited. In studies where cloze results were correlated with multiple-choice comprehension questions, researchers often *neglected* to describe fully what skills the questions were measuring, or to explain how they were developed. Although some researchers briefly mentioned the grade level of the students used in their studies, complete descriptions of subjects were woefully inadequate. A common and serious omission was the failure to report the reading levels of the subjects. In studies comparing cloze with other teaching methods, the "regular" method of instruction was seldom defined.

Five general problem areas have been identified in this section. These problems seem to have had limiting effects on much of the research concerned with cloze as a teaching technique. In the next section we will explore new directions that future cloze research may take and look specifically at alternatives for dealing with the problems cited.

Future Directions for Research

Past research investigating cloze as a teaching technique has been rather narrowly conceived and limited in scope. Most studies have employed the traditional experimental versus control group comparison by contrasting cloze with some conventional method of instruction. Nearly all investigators have considered cloze just in terms of improving reading comprehension. The fact is, we know very little about the efficacy of the cloze procedure as a teaching technique. Little or no attention has been focused on appropriate instructional strategies, methods of presentation, relative effects of varying deletion systems, or benefits derived by different age or grade levels. Research opportunities in this area are vast. However, if

future research efforts are to be profitable, and if we are to avoid a pitfall that has plagued so many other areas of reading research, future research must be approached systematically by building upon the cumulative knowledge of the past. Too often, unfortunately, investigators have not incorporated the efforts of others. The following section is intended to help future researchers come to grips with some of the problems that have confronted past research in this area and, hopefully, to lead investigators to more fruitful study of the issues. This discussion will be grouped under five subheadings which correspond to the problem areas discussed in the previous section.

1. *Improved teaching efforts.* The development of instructional strategies is a primary need. Past research has shown that merely completing cloze exercises is not enough. More deliberate teaching is necessary. But what form should such teaching take? Some investigators have suggested that discussions be used after the completion of cloze exercises to encourage students to explain their reasons for selecting responses (Schneyer, 1965; Bloomer, et. al,, 1966; Martin, 1968). Such discussions could be conducted either individually, between student and teacher, or on a group basis. Perhaps another useful approach would be discussions during the completion process. Small groups or classes could cooperatively work through the cloze task together. This procedure was effective with the first graders in Kingston and Weaver's study (1970). In addition to offering instructional value, individual and group discussions can be diagnostically useful by providing insights into the mental processes students are using. Jenkinson (1957), for example, found introspective and retrospective uses of cloze effective in distinguishing between the comprehension processes of good and poor readers.

Another instructional factor that deserves further explanation is the use of *performance criteria,* that is, predetermined levels of acceptable performance. Bloomer (1966) suggested that making movement through a series of passages contingent upon the quality of performance would serve as a motivational device. While performance criteria have been used (Roossinck, 1962; Bloomer, 1962), they

have not been isolated as experimental variables, so we know little about how such criteria affect the use of cloze. Certainly the investigator using a performance criterion will need an ample supply of cloze exercises. Repetition of the same passage quickly loses its effectiveness (Rothkopf, 1968).

Another fundamental issue that has never really been explored in instructional studies is the method of presenting cloze. Four presentation methods are common in the literature, but only the first two have been used in instructional studies:

(1) complete cloze exercise
(2) complete cloze exercise→answer multiple-choice questions
(3) read intact passage→complete cloze exercise
(4) complete pre-cloze→read passage→complete post-cloze

Surely the reader's task varies with each method, but how? Which method is best suited for instructional purposes? Future studies might well examine the differences among these methods.

Scoring systems are another vital aspect of the instructional use of cloze. Most authorities recommend accepting synonyms, in addition to exact replacements, as correct for teaching purposes. For some purposes, however, acceptance of responses of the same grammatical class may also be appropriate, as in teaching the structure of the language. Perhaps future researchers might explore a "shifting scoring system." Such a system could begin by accepting responses of the same grammatical class, the most lenient approach, gradually move to accepting synonyms, and finally require exact replacement, as students became more adept with the cloze procedure.

Finally, if teaching studies using cloze are to be effective, they must be more intense and of longer duration than they generally have been in the past. One or two brief exposures per week for a three to twelve week period seem hardly adequate. The cloze procedure must become an integral part of the instructional program. Future studies must be more longitudinal, lasting at least one semester to a year if they are to produce substantial and lasting effects.

2. *More direct focus on the problem.* Future researchers need to spell out exactly what skills they are attempting to develop. For research purposes, it is not enough to say one is interested in improving reading comprehension. Specifically, what kinds of comprehension will be emphasized? Many past researchers seem to have employed a kind of "shotgun" approach; they give cloze exercises and then hope for some kind of reading improvement. To increase their chances of observing improvement, they give tests which measure a variety of reading skills. Many areas have not been explored.

Future researchers should know why they are using their particular deletion system with the cloze procedure, and explain their reasons in their report. The every-nth deletion system, which assumes that because of semi-random sampling, a representative number of grammatical elements will be deleted in each passage, has been widely used in measuring readability. In previous instructional studies, many researchers have adopted the lexical-structural dichotomy suggested by Rankin (1957; 1959b). This division assumes that passages comprising lexical deletions measure the understanding of substantive content, while structural deletions involve an understanding of interrelationships of ideas and are more highly influenced by intelligence. While there is some evidence in the literature of the psychological reality of this dichotomy, it is not as convincing as many would like to believe. Does the lexical-structural dichotomy apply equally across all age or grade levels, or across all types of reading materials? Are certain deletion systems better than others at developing particular reading skills? Louthan (1965) found that students comprehend better after reading passages with noun determiners deleted than they did after reading intact passages. The greatest loss in comprehension came from the deletion of nouns, verbs, and modifiers, the basic meaning carriers of written language. There is also some evidence that the within-sentence order of elements has an effect on recall (Rothkopf, 1963). Future researchers might well begin by examining the relative effects of

varying syntactic deletions upon the development of specified reading skills.

Future investigations using cloze as a teaching tool should expand to other types of reading skills. Developing the ability to use context clues, for example, would seem to be an appropriate area of instruction to which to apply the cloze procedure. The recent empirical development of classification schemes by which to categorize context clues has given future researchers a framework in which to operate (Ames, 1966; Moskowitz, 1968; Quealy, 1969). Dulin (1968) has verified differences in difficulty between various context clues and also shown that grammatical classes function differently in combining with each contextual device. Rankin and Overholser (1969) have demonstrated that the cloze procedure can be used effectively to diagnose intermediate grade students' sensitivity to context clues. It would appear that the cloze procedure could be employed to teach students the use of context clues. By using one of the classification schemes as a basis for organizing instruction, a series of cloze passages could be developed that would systematically and sequentially lead students to an understanding of specific context clues.

No one has specifically explored the use of cloze in teaching reading in the content areas. It would appear that cloze might be a useful supplemental technique to the teaching of content subjects at the junior or senior high school level. If the lexical-structural dichotomy is valid, a lexical cloze exercise could provide a simply constructed pre-test of students' knowledge of a subject area at the beginning of an instructional unit. Culhane (1970) has suggested the deletion of nouns and verbs in teaching an understanding of the factual material found in content areas such as science and social studies. Louthan (1965), on the other hand, believes the removal of function words, such as noun determiners, focuses the reader's attention on larger units of meaning in the passage. The type of deletion system, as mentioned earlier, is open to question and empirical investigation. Various deletion systems should be systematically examined in various content areas to assess the teaching utility of cloze.

Some writers have begun to use cloze as a means of teaching language (Friedman, 1964; Torrey, 1969; Kingston & Weaver, 1970). Evidence suggests that cloze could be a useful technique for acquainting speakers of non-standard English with the more formal structures of written standard English. In studying the effectiveness of pattern drill, Torrey considered the cloze procedure a kind of controlled association test which measures a subject's sensitivity to form class. Kingston and Weaver have shown that under certain conditions cloze can be used for this purpose as early as first grade. As in teaching reading, future investigators using cloze to promote language learning will need to define specifically their teaching goals.

Research using the cloze procedure for teaching purposes should expand to still other areas. Little attention has been given to using cloze to develop word meaning skills. If the cloze procedure proves to be effective in developing the use of context clues, then with some adaptions, it may also be successful in *vocabulary development.* For instance, students may be asked to produce the word meanings of selectively deleted elements, or to recognize necessary affixes needed for varying contexts.

Rankin (1959a) has suggested some instructional uses of the cloze procedure for the reading clinic. By constructing cloze exercises from subject matter texts written at various levels of difficulty, the cloze procedure could provide greater transfer between the remedial situation and the classroom. Future studies might explore other clinical uses of the cloze procedure.

This second section has attempted to suggest future areas which cloze research might examine. Future efforts should be clear in purpose, with teaching goals carefully defined. Researchers must be cognizant of the varying effects of different deletion systems. The application of cloze should expand to other instructional areas such as the use of *context clues, vocabulary development, and reading in the content fields.*

3. *Better experimental designs.* Nearly all past research studies have employed the conventional experimental-control group comparisons,

one group receiving cloze and the other receiving some "regular" method of instruction. Using this type of research approach, investigators have pursued the question, "Is cloze better than teaching method X?" A more fruitful line of inquiry would be to ask how various deletion systems and methods of presentation influence the instructional usefulness of the cloze procedure. Also useful, would be exploratory studies to identify those benefits which cloze instruction has to offer students. Perhaps future research efforts should move away from the experimental-control group approach to more use of factorial designs which permit the examination of more than one effect.

In general, future researchers should utilize principles of good experimental design. Randomization procedures should be followed in the selection of subjects and in their assignment to treatments. When field constraints do not allow the preferred randomization, alternative procedures, such as an analysis of covariance, should be adopted. Schneyer (1965), for example, used his reading pre-test as an antecedent variable to equate his two groups in an analysis of covariance procedure. Future researchers would do well to employ blocking, stratifying, or leveling strategies (Glass and Stanley, 1970, p. 492). Such procedures have the advantage of reducing experimental error and making the design more sensitive to genuine effects. The confounding effects of past studies can be avoided by stratifying on relevant variables. For example, stratifying on deletion system (e.g., every-10th, selective lexical deletions, etc.) or on method of presentation would provide a more refined comparison of different levels of these variables and would also permit the assessment of interaction effects between these variables and others incorporated into the design. In past studies, very few researchers have even leveled or stratified on reading achievement and so were unable to test interaction effects between cloze teaching and reading ability. Proper control of extraneous variables and maximization of experimental variables require a clear understanding of the factors involved in a study and a well defined purpose.

4. *Improved measurement procedures.* Once the reading behaviors a researcher seeks to develop have been carefully defined, some measurement instrument must be selected which will validly measure those behaviors. Most past researchers have relied on standardized reading tests. Future researchers, if considering using standardized tests, should be critical in their selection. Does the test measure the reading skills emphasized in the instructional program? Is the test timed? If students have been given cloze exercises in untimed situations, it may be unfair to measure their reading progress with a timed test. Are the norms applicable to the population? If not, it may be more advantageous for a researcher to use local norms. Farr and Weintraub (1970) have discussed briefly some of these issues and suggested other factors which researchers should consider in selecting tests to measure dependent variables.

An alternative to standardized tests, would be the use of pre and post cloze tests. Bloomer (1966) constructed a final cloze test with deletions equally balanced between the various grammatical classes. Content, style, and difficulty of material could be kept constant across pre and post forms.

Future researchers should give careful consideration to the difficulties and procedures in measuring reading growth. The use of crude gains should be avoided in favor of more effective alternatives. Davis (1961) has proposed several methods of estimating the true amount of change for individuals or groups. He specifically recommends two of the methods (one for individuals; the other for groups) for researchers interested in determing gains. Another approach to assessing reading growth is the residual gain technique suggested by Tracy and Rankin (1967). Residual gain is the difference between a predicted post-test measure and an observed measure. This procedure has the effect of equating subjects statistically on the basis of the pre-test. According to the authors, the residual gain technique is desirable because it does not require that the tests be expressed in equal interval scales, and it is free of regression effects.

In some of the past studies, the permanency of gains has been questioned because of the administration of a test after a brief instructional program. Future researchers might assess the long-term retention of gains by using a delayed post-testing procedure, similar to that used by Ray (1965). Ray compared the three and six month measure of gains, following a reading program for college students, with a pre-test measure to assess the retention of improvement.

It is strongly recommended in future research efforts, where the assessment of reading growth is necessary, that investigators apply the procedures for measuring gains that have been suggested in this section of the paper.

5. *Guidelines for reporting cloze research.* If readers of research are going to be able to draw sound conclusions, conciseness in reporting is essential. The traditional criterion is—can another investigator replicate this study by following the research report? Unfortunately, many of the research reports reviewed in this paper do not meet this test. In the light of the weaknesses that have been noted in reporting previous research, the following guidelines are offered in the hope of promoting effective sharing and accumulation of knowledge:

1. Report the type of cloze procedure used. This should include the type of deletion, the rate of deletion, the total number of deletions, and the rationale for using this particular system.
2. Describe the material upon which the cloze passages are based. This should include the type of content, the style, and an estimate of the readability level.
3. Explain the scoring system used, e.g., exact replacements, synonyms, partial credit.
4. Fully describe the subjects used in the study. Descriptions should be based on factors such as reading level, grade placement, sex, socio-economic status, geographical environment, as well as other relevant variables.
5. If cloze results are to be correlated with other comprehension measures, describe those measures, state the types of comprehension questions used, and pre-validate them before use in the study.

6. If the cloze procedure is being compared to other teaching methods, describe such methods in terms of materials, time spent in instruction, and philosophy behind the program.

7. If the cloze procedure is used as a measure of performance, either before and/or after instruction, reliability estimates should be obtained on the cloze tests used.

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